

disclosed embodiments. On the contrary, the present invention is intended to cover various modifications and equivalent arrangements included within the spirit and scope of the appended claims, which scope is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures as is permitted under the law.

CLAIMS

What is claimed is:

1. A vehicle capable of traveling over uneven terrain with a load, said vehicle comprising:

- a frame having a front end, a rear end, and a fore-aft axis extending therebetween;

- a body mounted to said frame;

- an adjustable axle assembly mounted to said frame such that said adjustable axle assembly is aligned substantially orthogonal to said fore-aft axis;

- a pair of wheels rotatably mounted on the ends of said adjustable axle assembly such that said wheels are aligned substantially in parallel and are thereby capable of facilitating moving interaction with the ground;

- at least one supplemental ground-interacting apparatus mounted to said frame such that each said supplemental ground-interacting apparatus cooperates with said pair of wheels to thereby maintain clearance between both said frame and said body and said ground;

- an actuation system capable of mechanically adjusting said adjustable axle assembly to thereby adjust the fore-aft position of said pair of wheels relative to both said frame and said body; and

- an electronic controller mounted to said body and electrically connected to said actuation system;

wherein said electronic controller is capable of communicating electrical control signals to said actuation system to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain the fore-aft stability of said vehicle.

2. A vehicle according to claim 1, wherein said frame and said body are substantially integral with each other within a substantially uni-body construction.

3. A vehicle according to claim 1, wherein each said supplemental ground-interacting apparatus is a rotatable wheel assembly.

4. A vehicle according to claim 1, wherein each said supplemental ground-interacting apparatus is selected from the group consisting of a ski runner, an anti-tip disc, and a sliding disc.

5. A vehicle according to claim 1, said vehicle further comprising a pair of ground-interacting track assemblies mounted to said adjustable axle assembly such that said pair of wheels is engaged within said pair of ground-interacting track assemblies to thereby facilitate moving interaction with said ground.

6. A vehicle according to claim 1, said vehicle further comprising:
an operator control panel mounted to said body, electrically connected to said electronic controller, and capable of receiving operator preference input regarding said fore-aft position of said pair of wheels;

wherein said operator control panel is capable of communicating electrical operator preference input information signals to said electronic controller to

thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

7. A vehicle according to claim 1, said vehicle further comprising:
at least one attitude sensor mounted to said frame, electrically connected to said electronic controller, and capable of sensing the attitude of said vehicle;

wherein each said attitude sensor is capable of communicating electrical vehicle attitude information signals to said electronic controller to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

8. A vehicle according to claim 7, wherein each said attitude sensor includes gyroscope technology.

9. A vehicle according to claim 7, wherein said electronic controller includes:

means for processing said electrical vehicle attitude information signals communicated from each said attitude sensor to thereby actively help determine the center of gravity of said vehicle as said vehicle travels over uneven terrain; and

means for generating said electrical control signals according to said actively determined center of gravity to thereby prompt said actuation system to adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle;

wherein said electrical vehicle attitude information signals processing means and said electrical control signals generating means together comprise at least one electronic microprocessor.

10. A vehicle according to claim 1, said vehicle further comprising:

at least one load sensor mounted to said frame, electrically connected to said electronic controller, and capable of sensing the position and weight of said load onboard said vehicle;

wherein each said load sensor is capable of communicating electrical load information signals to said electronic controller to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

11. A vehicle according to claim 10, wherein said electronic controller includes:

means for processing said electrical load information signals communicated from each said load sensor to thereby actively help determine the center of gravity of said vehicle as said vehicle travels over uneven terrain; and

means for generating said electrical control signals according to said actively determined center of gravity to thereby prompt said actuation system to adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle;

wherein said electrical load information signals processing means and said electrical control signals generating means together comprise at least one electronic microprocessor.

12. A vehicle according to claim 1, said vehicle further comprising:

at least one position sensor mounted to said frame, electrically connected to said electronic controller, and capable of sensing the position of said adjustable axle assembly onboard said vehicle;

wherein each said position sensor is capable of communicating electrical axle assembly position information signals to said electronic controller to thereby

adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

13. A vehicle according to claim 12, wherein said electronic controller includes:

means for processing said electrical axle assembly position information signals communicated from each said position sensor to thereby actively help determine the center of gravity of said vehicle as said vehicle travels over uneven terrain; and

means for generating said electrical control signals according to said actively determined center of gravity to thereby prompt said actuation system to adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle;

wherein said electrical axle assembly position information signals processing means and said electrical control signals generating means together comprise at least one electronic microprocessor.

14. A vehicle according to claim 1, wherein said adjustable axle assembly includes:

a cross arm assembly; and

a pair of swing arms having pivotal ends pivotally mounted to said frame and distal ends interconnected with said cross arm assembly;

wherein said wheels are rotatably suspended from said swing arms proximate said distal ends.

15. A vehicle according to claim 14, wherein said actuation system includes:

a pair of telescoping cylinders connected between said frame and said pair of swing arms;

wherein said telescoping cylinders are electrically connected to said electronic controller so that said electronic controller is capable of communicating said electrical control signals to said telescoping cylinders to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

16. A vehicle according to claim 1, wherein said adjustable axle assembly includes:

a cross arm assembly; and

a pair of slide arms slidingly engaged with said frame and interconnected with said cross arm assembly;

wherein said wheels are rotatably suspended from said slide arms.

17. A vehicle according to claim 16, wherein said actuation system includes:

a pair of telescoping cylinders connected between said frame and said pair of slide arms;

wherein said telescoping cylinders are electrically connected to said electronic controller so that said electronic controller is capable of communicating said electrical control signals to said telescoping cylinders to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

18. A vehicle according to claim 1, wherein said adjustable axle assembly includes:

a cross arm assembly; and

a pair of swing arms having pivotal ends pivotally mounted to said frame and distal ends interconnected with said cross arm assembly;

wherein said wheels are rotatably suspended from said swing arms proximate said distal ends.

19. A vehicle according to claim 18, wherein said actuation system includes:

- a pair of racks fixed to said frame;

- a pair of pinion gears rotatably mounted to said distal ends of said pair of swing arms such that said pinion gears are engaged with said racks; and

- an electric motor capable of mechanically dictating concomitant rotation of said pinion gears and thereby movement of said pinion gears along said racks;

wherein said electric motor is electrically connected to said electronic controller so that said electronic controller is capable of communicating said electrical control signals to said electric motor to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain said fore-aft stability of said vehicle.

20. A vehicle capable of traveling over uneven terrain with a load, said vehicle comprising:

- a frame having a front end, a rear end, and a fore-aft axis extending therebetween;

- a power source mounted to said frame;

- a body mounted to said frame;

- an adjustable axle assembly mounted to said frame such that said adjustable axle assembly is aligned substantially orthogonal to said fore-aft axis;

- a pair of wheels rotatably mounted on the ends of said adjustable axle assembly such that said wheels are aligned substantially in parallel and are in mechanical communication with said power source for thereby facilitating moving interaction with the ground;

at least one supplemental ground-interacting apparatus mounted to said frame such that each said supplemental ground-interacting apparatus cooperates with said pair of wheels to thereby maintain clearance between both said frame and said body and said ground;

an actuation system capable of mechanically adjusting said adjustable axle assembly to thereby adjust the fore-aft position of said pair of wheels relative to both said frame and said body;

at least one attitude sensor mounted to said frame and capable of sensing the attitude of said vehicle; and

an electronic controller mounted to said body and electrically connected between each said attitude sensor and said actuation system;

wherein each said attitude sensor is capable of communicating electrical vehicle attitude information signals to said electronic controller; and

wherein said electronic controller is capable of communicating electrical control signals to said actuation system to thereby adjust said fore-aft position of said pair of wheels as necessary to actively maintain the fore-aft stability of said vehicle.